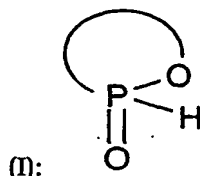


Claims

1. A process for preparing a water-thinnable phosphorous-containing polymer precursor which polymer precursor is a polyester, which process comprises the steps of
- (a) providing a polyester which comprises phosphinate ester (P-O-C) bonds and
- (b) hydrolysing at least part of said phosphinate ester (P-O-C) bonds.
2. A process as claimed in claim 1, in which at least part of said phosphinate ester (P-O-C) bonds are hydrolysed selectively without hydrolysing the polyester backbone of the polymer precursor.
3. A process as claimed in claim 1 or 2, in which at least part of said phosphinate ester (P-O-C) bonds are hydrolysed in the presence of an alcoholic solvent.
4. A process as claimed in claim 3, in which the alcoholic solvent is selected from straight, branched or cyclic, saturated or unsaturated C₁₋₆-alkanols and in particular from the group consisting of methanol, ethanol, n-propanol, isopropanol, n-butanol, isobutanol and tert.-butanol.
5. A process as claimed in any of the preceding claims, in which at least part of said phosphinate ester (P-O-C) bonds are hydrolysed in the presence of a base, preferably a strong inorganic base.
6. A process as claimed in any of the preceding claims, in which the polyester comprises at least two (meth)acrylate groups.
7. A process as claimed in any of the preceding claims, in which the polymer precursor is a radiation-curable polyester, the process comprising the steps of
- (a) mixing together:
- (i) a compound containing at least one hydrocarbylidenically unsaturated group and a plurality of carbonyloxy groups;
- (ii) optionally a compound having a plurality of carbonyloxy groups and optionally free of hydrocarbylidenically unsaturated groups;
- (iii) a polyol, and
- (iv) an oxyphosphorous-containing compound (component (iv)) in which the phosphorous atom has at least one P-C bond and at least one P-O-C moiety which are resistant to hydrolysis or transesterification under the reaction conditions

under steps (b) and (c); such component (iv) comprising a compound of formula (I) and/or effective isomers, salts and mixtures thereof:



where, in formula (I): the phosphorous atom is substituted with at least one carbon atom to form at least one P-C bond; the P-O bond forms part of an organo ring, the ring being optionally substituted with one or more organo groups and/or optionally fused to one or more other organo rings;

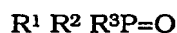
(b) initiating polymerisation of the mixture to form a hydroxy and/or carboxy terminated

phosphorous containing polyester oligomer ("First Polymer"),

(c) reacting the First Polymer with at least one acrylating agent to form a radiation-curable polymer precursor ("Second Polymer"),

(d) hydrolysing at least part of the phosphinate ester (P-O-C) bonds in the Second Polymer.

8. A process as claimed in claim 7, in which component (IV) comprises a compound of formula II where



in formula (II): at least R^1 and R^2 independently represents C_{1-20} organo group substituted by one or more hydroxy and/or carboxy group; R^3 represents H or optionally substituted C_{1-20} organo group;

9. A process as claimed in any of the preceding claims, in which said phosphinate ester (P-O-C) bonds are in the side chain(s) of the polyester and the phosphorous atom of said phosphinate ester (P-O-C) bonds forms part of the backbone of said polyester or is directly or indirectly bonded to the backbone of said polyester via a bond which is not said phosphinate ester (P-O-C) bond.

10 A process as claimed in any of the preceding claims, in which the polyester comprises 9,10-dihydro-9-oxa-10-phosphaphenanthrene-10-oxide residues.

11 A water-thinnable phosphorous-containing polymer precursor obtainable from the process as claimed in any of the preceding claims.

12 A flame-retardant composition comprising a polymer precursor as claimed in claim 11

5 13 A flame-retardant coating comprising a flame-retardant layer over a substrate (layer (1)) which layer is obtainable by curing a composition as claimed in claim 12.

10 14 A flame-retardant coating as claimed in claim 13, comprising at least one other layer (layer (2)) over the flame retardant coating, said other layer containing optionally sublayers (2a, 2b...)

15 15. A flame-retardant coating as claimed in claim 14, in which at least layer (2) is transparent.

15 16. A flame-retardant coating as claimed in claim 14 or 15, in which layer (2) imparts abrasion-resistance to the coating.

20 17. A flame-retardant coating as claimed in one of claims 14 to 16, in which the layer (2) contains at least one flame-retardant sublayer.

18. Use of polymer precursor as claimed in claim 11 for preparing a flame-retardant composition.

25 19. Use of a flame-retardant composition as claimed in claim 12 for coating a substrate

20. A substrate at least part of which is coated with a coating as claimed in any of claims 13-17.

30 21. A coated substrate according to claim 20, which substrate comprises wood, textile, fiber, metal or plastics.